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WEIGHT LOSS OF SUMMER-STORED SWEETGUM, YELLOW-POPLAR, RED OAK, AND LOBLOLLY PINE SAW LOGS

by

Joseph R. Saucier and Douglas R. Phillips



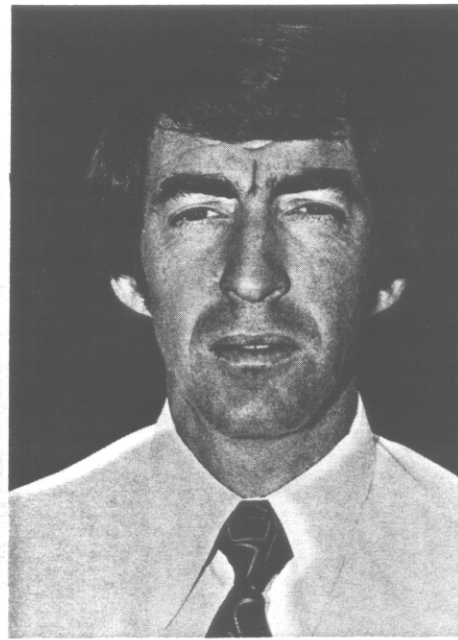
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INTRODUCTION

Many wood-using industries in the South now purchase logs on a weight basis. Weight-scaling is quick and with appropriate conversion factors it is accurate for freshly cut logs. Often, however, logs cannot be hauled to a mill immediately, and they lose weight as they dry on a landing. Weight loss of southern pine tree-length logs in storage has been reported (Freeman 1962, Clark and Phil-

lips 1972), but information on southern pine saw logs (16 feet in length) is lacking and no information is available on the weight-loss of stored hardwood saw logs.

This paper reports rates of weight-loss in stored southern pine and hardwood saw logs at three locations in Georgia. These locations in north, middle, and south Georgia differ in climate and physiography and results represent a full

range of conditions for the State. Previous results indicated that moisture loss from logs is minimal during the winter, so our weight-loss measurements were taken during the more severe drying conditions of summer, when log supply is generally high, and some storage before marketing is often required.

PROCEDURE

Saw logs (16 feet in length) ranging in scaling diameter from 8 through 16 inches, were cut, loaded on flat-bed trailers and weighed within 24 hours from harvesting at each of the three study locations between June 5 and June 7, 1979. Loblolly pine and red oak were stored at all locations, while sweetgum and yellow-poplar were stored at two locations where they occur in sufficient quantity for commercial sale. Table 1 describes sample logs at each location. For each species at each location, trailer loads contained approximately 25 logs (5 in each scaling diameter class from 8 through 16 inches) which remained on the trailers throughout 4 months of storage. After the initial weighing, loaded trailers were stored on the wood yard where they were reweighed weekly during the first 2 months and bi-weekly during the final 2 months of storage.

At each location, the same truck with full gas tank was used for all weighing to pull the loaded trailers onto the scales (Figure 1). Between weighings, plywood sheets were placed between the trailer bed and the ground to prevent air circulation under the load, and thus simulate log storage on the ground as closely as possible (Figure 2). Weekly rainfall was recorded at each storage site during the study period.

RESULTS AND DISCUSSION

Weight losses of all species were meaningful at all three locations (Table 2, figure 3 through 6).

Loblolly Pine

Moisture loss of loblolly pine was greatest throughout the storage period at the south Georgia location where the stored logs lost 2.6 percent by weight in the first week, 4.2 percent in 2 weeks and a total of 13.9 percent after 4 months. Only after 3 months did the rate of loss level off (Figure 3). The north and middle Georgia logs lost approximately 40 percent less weight than those in south Georgia. A large proportion of the loss in north Georgia occurred during the first month of storage. There are two explanations for this rapid loss in the first month there. First, the north Georgia sample logs were smaller (Table 1), came from younger trees, and thus had thinner bark, lower density, and higher initial moisture content than the more mature trees of middle and south Georgia. Secondly, June

Table 1. Species, location, and sample description of weight-loss logs

Species	Location	Sample logs number	Log scaling diameter		
			Min. :	Max. :	Avg.
Loblolly pine	North Georgia	25	7.2	13.1	9.8
	Middle Georgia	25	7.5	16.4	12.1
	South Georgia	25	7.2	16.9	11.4
Red Oak	North Georgia	25	8.0	18.3	12.2
	Middle Georgia	20	8.2	15.9	12.2
	South Georgia	25	7.1	16.4	12.0
Sweetgum	Middle Georgia	20	9.1	15.5	12.9
	South Georgia	25	7.4	16.8	12.1
Yellow-poplar	North Georgia	25	7.4	17.2	11.0
	Middle Georgia	24	7.9	17.0	11.9



Figure 1. —Trailer loads of stored logs were weighed weekly during the first month of storage and biweekly thereafter.

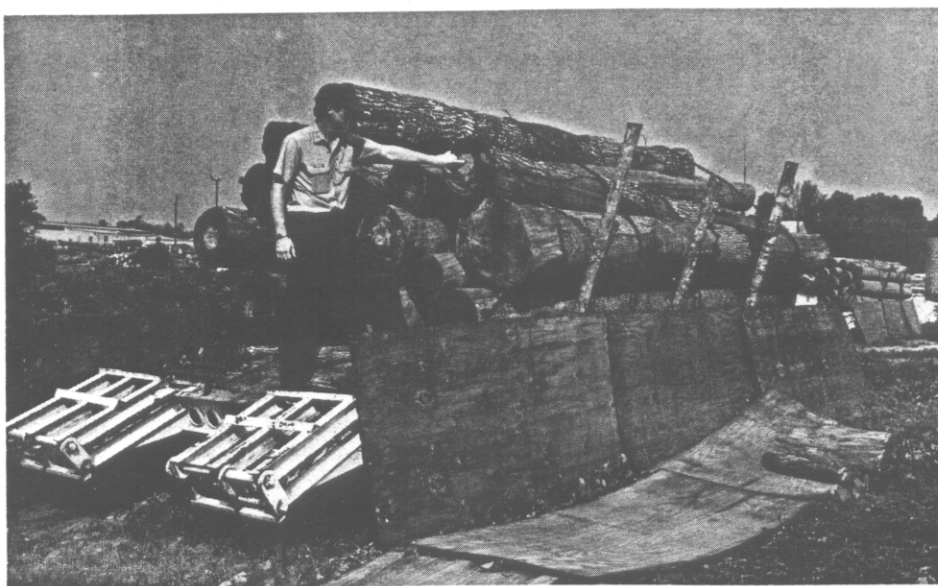


Figure 2. —The stored logs remained on trailers at the storage site throughout the study period. Baffling was done to prevent air movement under the logs.

Table 2. Percent weight loss of 16-foot logs by species and location during four months summer storage, June 5 - October 10, in Georgia

June 5 - October 10, in Georgia								
Species	Location	Initial weight of logs	Cumulative periodic weight loss					
			1 wk :	2 wk:	1 mo:	2 mo:	3 mo:	4 mo
		pounds	percent					
Loblolly pine	North Georgia	16,240	2.3	3.8	5.3	5.2	7.9	7.8
	Middle Georgia	28,520	1.4	2.4	3.4	4.6	6.4	8.1
	South Georgia	27,750	2.6	4.2	6.2	8.6	13.7	13.9
Red Oak	North Georgia	26,180	1.8	3.1	4.5	5.2	6.3	6.7
	Middle Georgia	23,260	3.1	4.1	6.8	7.4	9.3	11.3
	South Georgia	29,054	2.8	4.2	6.4	8.0	10.6	11.4
Yellow-poplar	North Georgia	19,180	2.9	4.9	7.2	7.9	11.4	12.3
	Middle Georgia	25,020	2.5	4.6	7.9	10.9	15.4	17.8
Sweetgum	Middle Georgia	26,180	4.7	8.7	14.1	18.0	22.8	25.8
	South Georgia	26,614	4.0	7.0	9.7	13.4	17.5	18.8

was a dry month in north Georgia compared to the other areas as indicated in Figure 7 where periodic rainfall is plotted over the storage period.

Red Oak

During 4 months of storage, weight loss of red oak was 6.7 percent in north Georgia and 11.3 and 11.4 percent in middle and south Georgia (Table 2). The rate of moisture loss from red oak at the northern location was consistently less throughout the storage period, but was relatively rapid during the first month of storage. Again, dry weather in North Georgia during the first month of storage is reflected in the drying rate of the species. Moisture losses from red oak stored in middle and south Georgia were almost identical (Figure 4).

Yellow-poplar

Moisture losses from yellow-poplar were rapid in both north and middle Georgia during the first 2 weeks of storage, totaling nearly 5 percent. Weight loss continued at a fast rate through the first month when moisture losses for this species totaled 7.2 and 7.9 percent, respectively (Table 2). The rate of weight-loss for yellow-poplar like other species stored in north Georgia decreased in the second month of storage which coincides with the high rainfall period at this location (Figure 7). Moisture loss from yellow-poplar stored in middle Georgia continued at a rapid rate, culminating at 17.8 percent after 4 months (Figure 5). High rainfall did not occur in middle Georgia until after 3 months of storage when drying had already exceeded 15 percent.

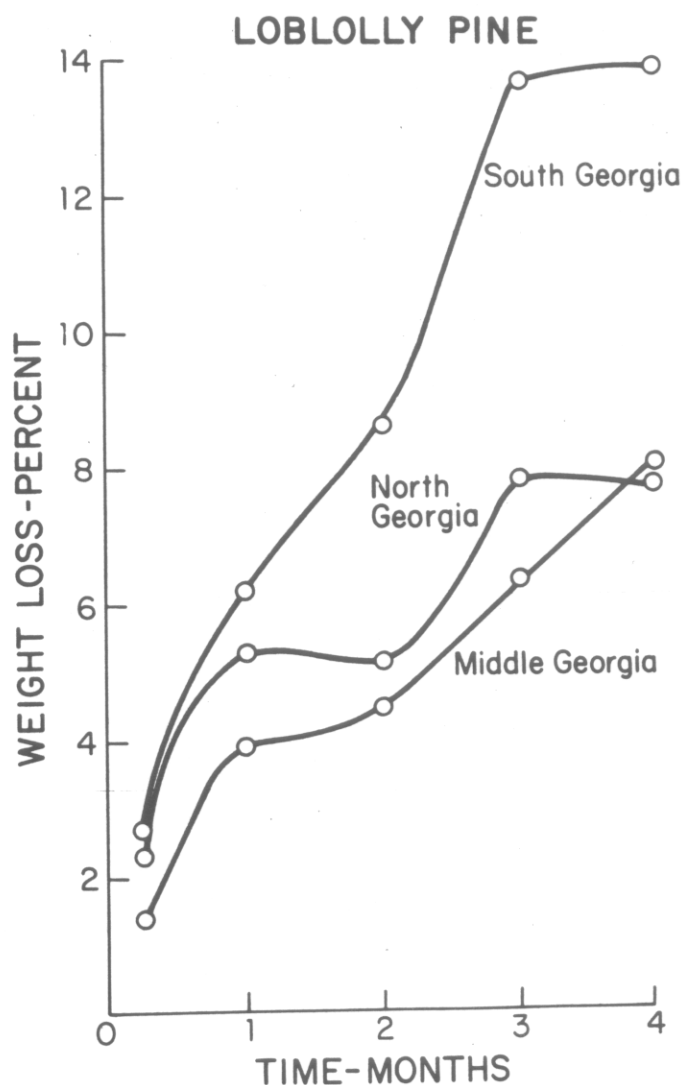


Figure 3. --Weight loss of stored loblolly pine at three locations in Georgia.

Sweetgum

Sweetgum was stored at two locations; middle and south Georgia. This species had the greatest weight loss of any study species. Significant weight was lost in 1 week, and drying continued throughout the 4-month storage period (Table 2).

Losses totaled 25.8 percent in middle Georgia and 18.8 percent in south Georgia. Unlike other species, sweetgum lost more moisture in middle Georgia than in south Georgia. The explanation is that when the middle Georgia logs were harvested, approximately 25 percent of their bark was lost (Figure 2). Because the bark

"slipped" so readily during normal harvesting in middle Georgia, comparison with drying rates in south Georgia is not entirely valid. These logs, however, are representative of logs harvested in middle Georgia in early June when growth is rapid and bark is loose.

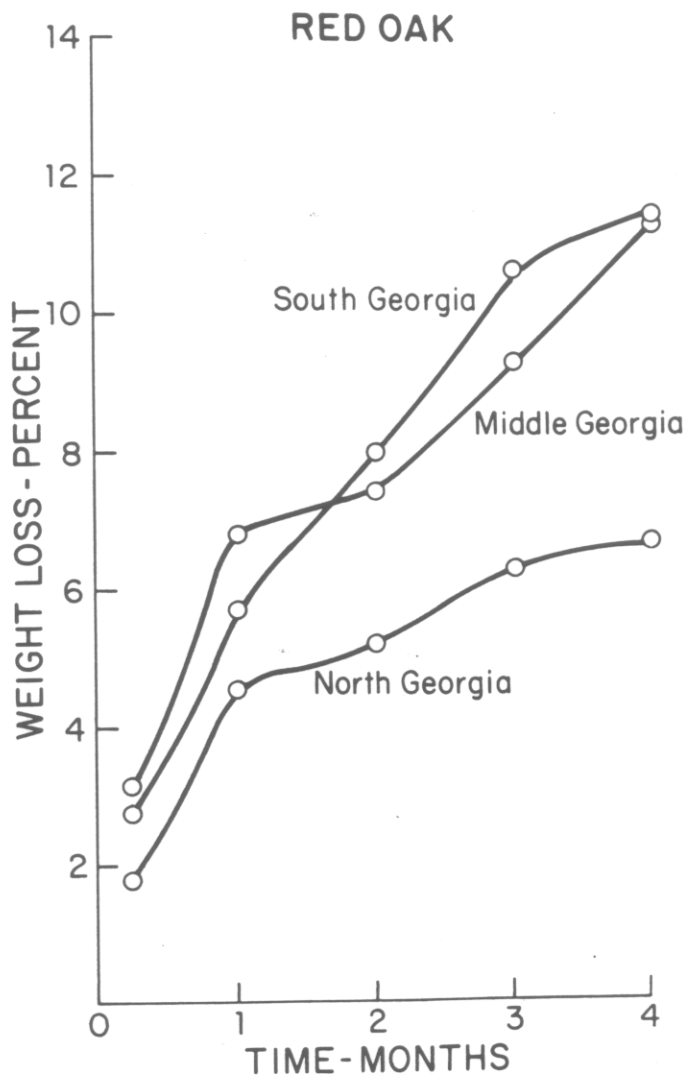


Figure 4. --Weight loss of stored red oak at three locations in Georgia.

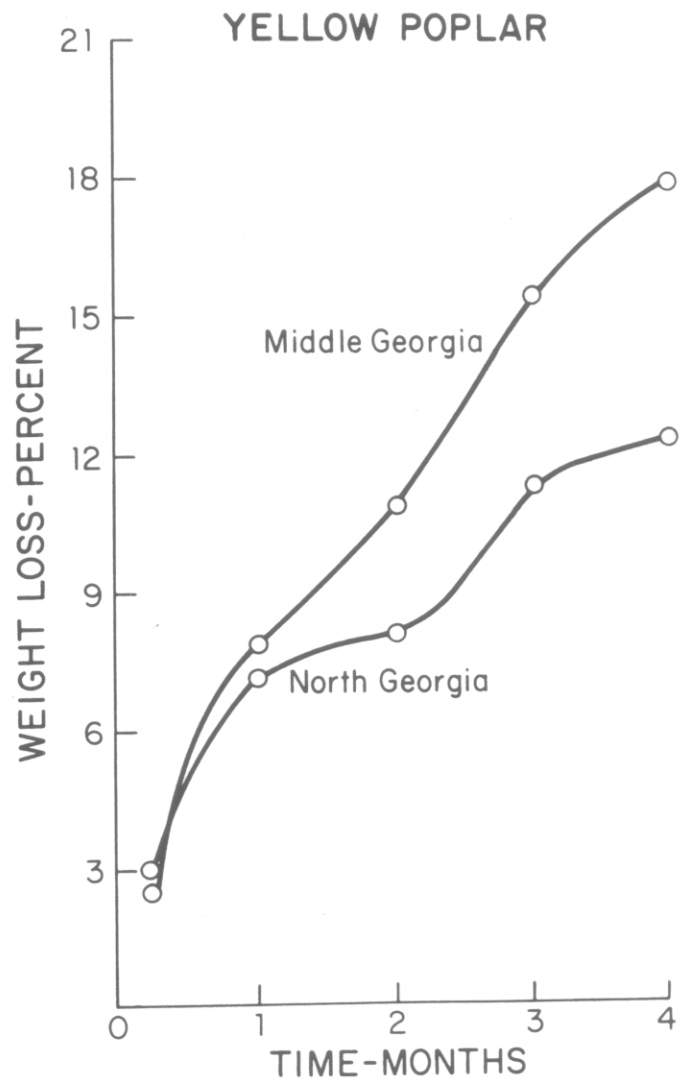


Figure 5. --Weight loss of stored yellow-poplar at two locations in Georgia.

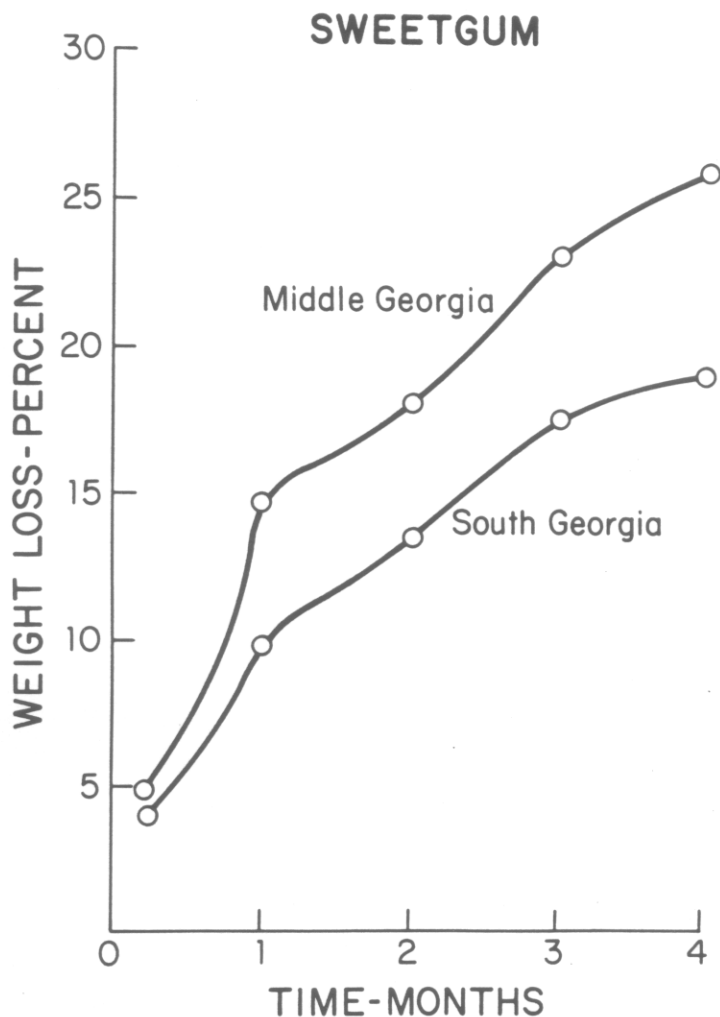


Figure 6. --Weight loss of stored sweetgum at two locations in Georgia.

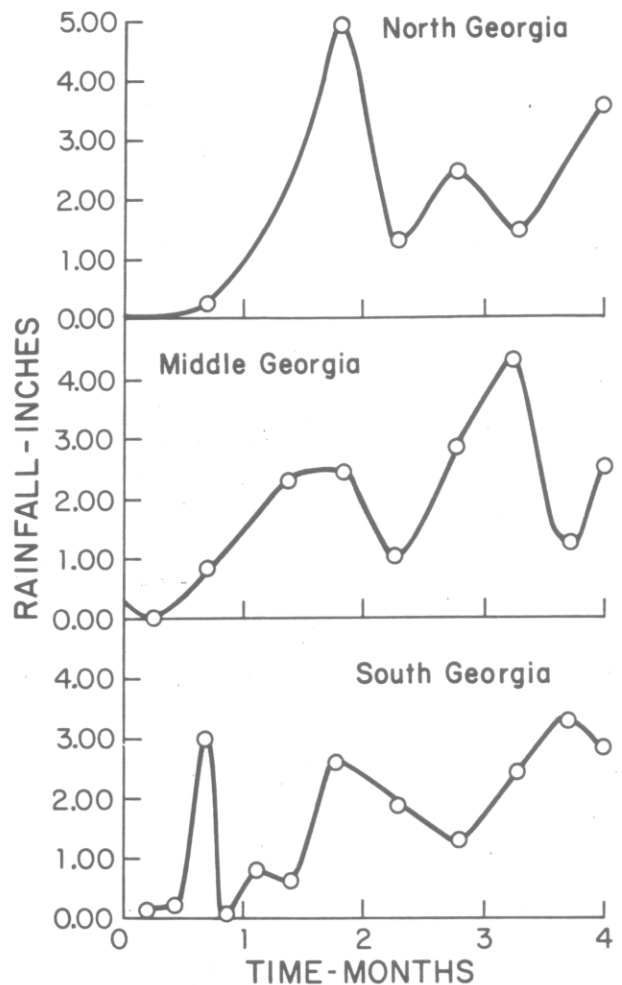


Figure 7. --Periodic rainfall at the three log storage sites in Georgia.

SUMMARY AND CONCLUSION

Weight loss of saw logs stored during the summer in Georgia was significant at all locations. The soft textured hardwoods represented by sweetgum and yellow-poplar decreased in weight by 7 to 10 percent in 1 month, while sweetgum logs that had lost some bark decreased 14 percent in weight. When these species are stored for more than 3 months, weight-loss will range from 12 to 18 percent.

Hard hardwoods represented by red oak lost 4 to 7 percent of their weight in 1 month and 7 to 11 percent in 4 months. Logs stored in north Georgia lost about 40 percent less weight than logs stored in middle and south Georgia.

Weight loss of loblolly pine ranged from 3 to 6 percent after 1 month and 8 to 14 percent after 4 months in north Georgia. Like oak, pine logs stored in

north Georgia lost about 40 percent less weight than logs stored in middle and south Georgia.

These results indicate that saw logs of many species lose significant amounts of weight when stored in the summer in the South. If logs are stored for 1 month or more, factors for converting weight to volume require adjustment.

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